The Coming Nuclear Winter Base Metals
To: The Geneva Conference On Base Metals Investing
From: Frank Veneroso

October 3, 2006

Introduction

I am going to give you a bearish presentation on base metals. I have titled this presentation the "Coming Nuclear Winter For Base Metals". It is my belief that the current base metals prices, which are a multiple of marginal cost, which is their long run price equilibrium, are simply ludicrous. They are here only because of unprecedented speculation.

This speculation has resulted in price increases in base metals in real or inflation adjusted terms that are far greater than in any half decade cycle since the late 19th century. Base metals are not assets. They are goods of use. Like all such goods they must follow the basic principles of microeconomics. That means that such record high prices will in time, ration demand or, to use the more colorful language of the market place, they will destroy demand. At the same time they will encourage supply. The end result will be huge surpluses and an inevitable reversion to mean and more. That implies prices below marginal cost yet once again.

I believe this process has been well underway for some time. The yet higher prices this year along with their perseverance will make matters worse – worse perhaps than they have been in any cycle since the late 19th century. Because generalized inflation in this cycle has been especially low, once the industry specific pressures on costs abate and reverse – as they always do - we will see that marginal cost has not changed, even in nominal terms. But the excess of record overshooting in this cycle will lead to extremely deep undershooting of marginal cost when this cycle finally reverses and runs its course.

This is the microeconomic side of the story. Less compelling but still real is the macroeconomic side. In almost all base metal cycles, after those several years of a bull market which triggers the microeconomic forces of reversal described above, there occurs as well a global economic slowdown or recession. This adds to the inevitable downswing in the base metals cycle by lowering global demand below trend.

It is now widely recognized that the four year U.S. economic expansion is now endangered by a bursting of the U.S. housing bubble. It is less commonly acknowledged that the investment boom in China – the other global economic locomotive – will end in a bust as well. My assessment is that some measure of both will materialize in the coming year or two. This will add to the forces that will round trip this extraordinary base metals bubble. It is not a necessary condition of the bear market I foresee, but it will probably be a contributing cause.

The laws of economics that have made base metals terribly cyclical since the onset of the industrial revolution and before have not been repealed. Except this time the excesses are unprecedented. There will be a commensurate downswing in amplitude and duration. Brace yourselves for a nuclear winter for base metals markets.

Has The Commodity Bear Market Begun?

I believe it has for myriad reasons. About two months ago the principal commodity indices were at key moving averages and trendlines that provided support for the bull move in commodities over the last five years. These technical patterns looked toppy. A break of the five year trend was suggested. Below is an executive summary from a piece I wrote at that time suggesting that the commodity bubble may be bursting.

Executive Summary

1) *The increase in real commodity prices in this cycle is the largest that has ever occurred over a half decade cycle. Since the onset of the industrial revolution.*

2) *There has been nothing about the overall macro environment since the beginning of this decade that justifies such an increase in real commodity prices.*

3) *There was underinvestment in some commodity sectors at the end of the prior decade due to excessive enthusiasm about technology versus basic industries. But investment in commodity producing industries has now caught up and there are rapid increases in supply in many commodities.*

4) *What explains the unusually strong behavior of such prices in this decade? Investment and speculative flows. There has been a bubble in commodity prices created by an unprecedented surge in investment and speculative funds seeking to crowd into a market which is too small to accommodate today's huge financial flows.*

5) *The CRB has come down to its 200 day moving average time and time again in this bull market. Overall the 200 day has contained the 5 year trend in commodity prices. Typically it has broken it marginally and then rallied to a new high. But this last time it rallied off this key moving average, it failed to make a new high. That was a first for this cycle.*

6) *Key will be whether it recovers above the 200 day and rallies, or whether it falls to a new low for the move. Today it is probing a new low. A little more weakness and various long term trend lines that have defined ascending support for this bull market will be broken.*

7) *We have now had a commodity bull market for years. Decades of history tell us that when prices rally this far and for this long we are well into the phase of overinvestment which creates the gluts of the next down cycle.*

8) In most commodities supply growth is now considerable. The lagged response of output to investment promises yet more rapid supply growth to come.

9) Micro economics tells us that high prices should be rationing demand as well. That is less apparent so far. But there are signs.

10) In many cases the combination of both demand rationing and supply encouragement have thrown markets into significant surplus. These micro forces are probably the key reason why the CRB may be "rolling over".

11) In some cases like grains and natural gas such surpluses have forced prices to fall despite still rising investment and speculative demands. In others like base metals mega speculative and investment flows are so strong that prices remain at record levels despite markets shifting into surplus.

12) The pressures of hedge fund and institutional buying of commodity futures has pushed nearby futures upward versus the spot price. The first large contango appeared in energy. More recently this cost of carry problem has expanded to other commodities.

13) Now commodity baskets overall are in supercontangos. The trend no longer seems to be a reversion to the past norm of backwardation. The pressure of fund buying of futures plus growing surpluses is making the overall basket contango ever wider. The cost of carry for some baskets now exceeds 15% per annum.

14) No one can afford the huge cost of carry that now prevails and will continue to prevail. As more and more institutional investors recognize this all important change is permanent, the fund flows behind the commodity bubble will abate and eventually reverse. The beginning of this process may be contributing to a possible "rolling over" of the CRB.

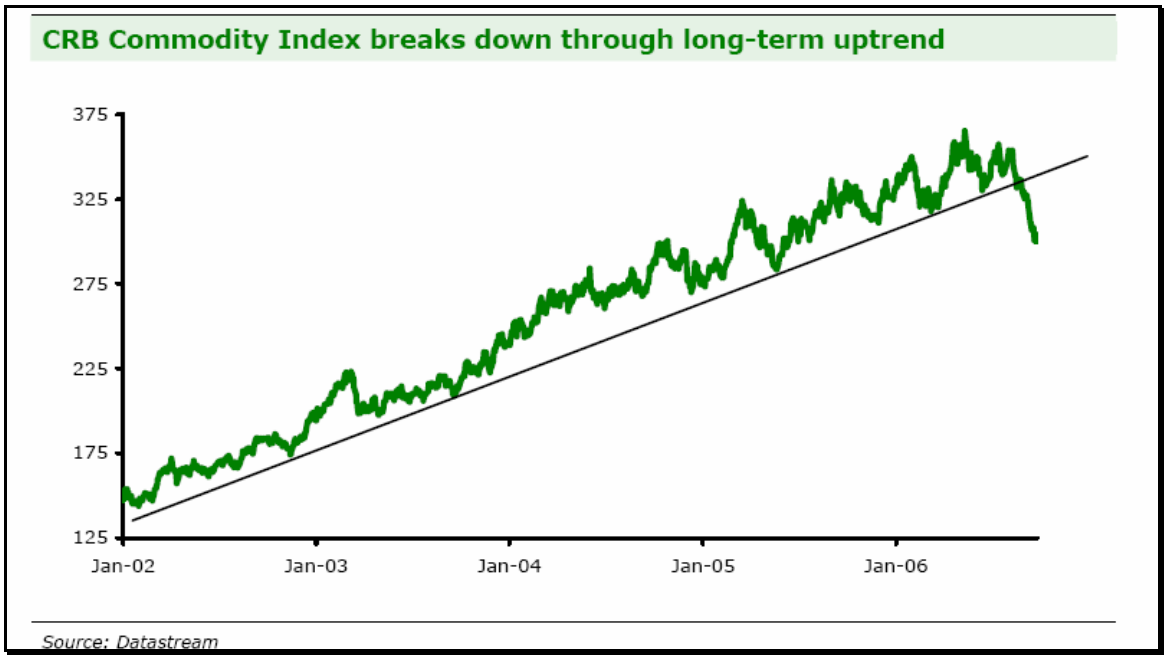
15) Has global economic growth decelerated? Probably a bit. Is that enough to change the course of commodity prices? At the margin yes, but only if the other two more relevant factors discussed above are in force.

16) The impact of a global growth slowdown is next year's story. The U.S. economy is being slowed by a bursting of a dangerous housing bubble. But it still has late cycle momentum. A serious U.S. slowdown is probably a 2007 event. Again, a Chinese hard landing probably lies ahead, but that again is a 2007 story.

17) Of course, if commodities have been bubblized by hedge funds, pensions, and endowments, then commodity prices can be taken down by perceptions of a global economic slowdown before one actually materializes.

18) *If the micro forces of supply and demand and the prohibitive cost of carry of commodity derivatives act to fell commodity prices now, speculators may conjure up a slowing global economy to amplify any new downtrend that might be underway, even if the real world macro depressants still lie ahead.*

Since I wrote this in August we have had a very sharp and protracted decline in the commodity indices. Nick Moore of ABN AMRO provides us with the following chart.



-*Winds of Change*, Nick Moore,
ABN AMRO, September 28, 2006

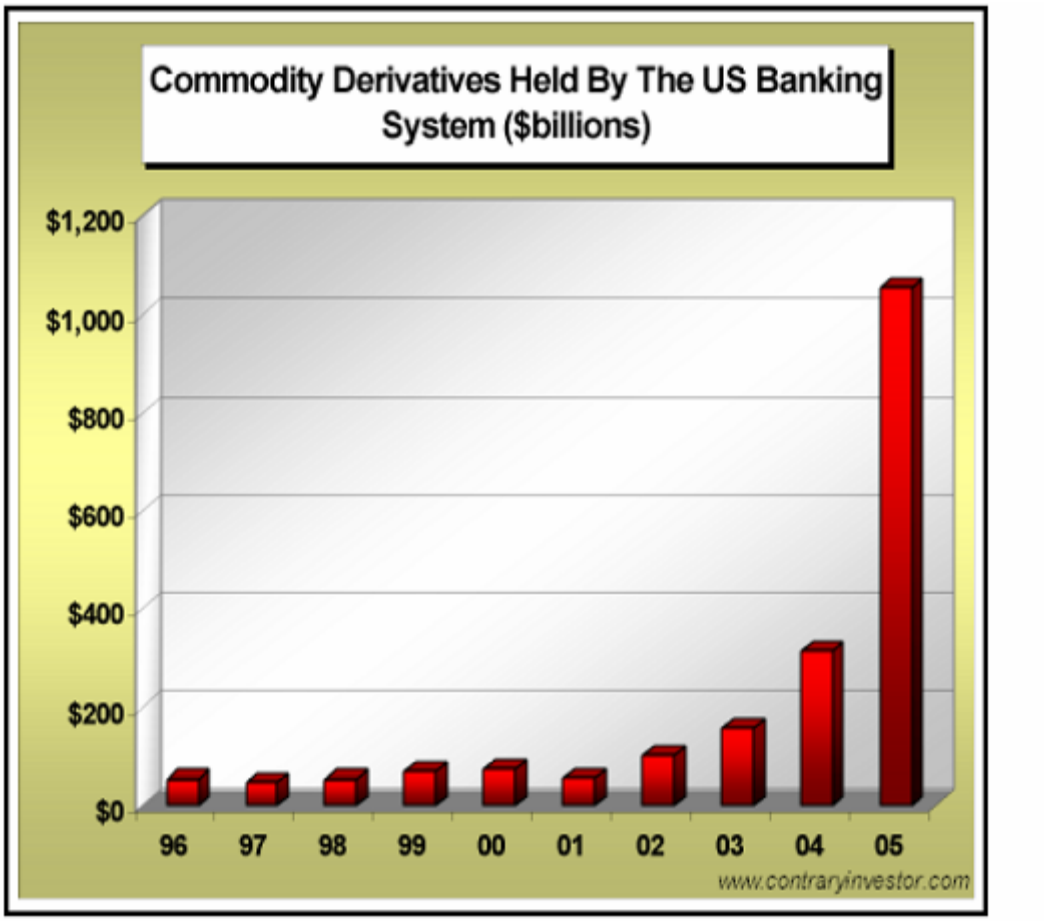
I believe this move is for real and that it has commenced largely for the reasons I outlined in August

Investment Or Speculation?

I presume you are all commodity "mavens". You look to the CFTC commitment of traders data to see if metals markets have too many "spec longs". If you do, you are misled. This cycle has been different.

First the hedge funds have moved to disguise their positions as commercial rather than speculative positions through their arrangements with brokers. But, more importantly, they now operate mostly "over the counter". These positions do not show up in the CFTC data for the most part, and, to the extent they do, they show up as dealer (commercial) positions.

How can we assess this? I like to present the following chart to illustrate.



Now these are commodity derivatives positions of U.S. commercial banks as reported to the U.S. office of the Controller of the Currency. They increased 20 times in four years. They have exploded further in the first 6 months of this year. What does this data tell us? Why has there been an explosion of commodity derivates at U.S. commercial banks?

I believe that this explosion reflects a dramatic increase in investment and speculative purchases of commodity derivatives – chiefly longs – by pensions and endowments buying commodity "baskets" as well as hedge fund speculation. When speculators go long futures derivatives and others (mostly commercials) go short someone must stand to make sure these contracts in the end "perform". In this regard the futures exchange acts as principal for the longs and shorts in the futures market. In OTC commodity derivative transactions someone else must guarantee performance. So dealers who arrange those trades act not only as brokers but also as principals. That means that when a fund goes long in the OTC forward market and a producer goes short, the dealer assumes two counter party commodity derivative positions in his role as a principal. If the dealer is a U.S. commercial bank like JP Morgan or Citibank an increase in commodity derivatives appears on their books when investors and speculators increase their positions in the OTC commodities markets.

The OCC data set forth above extends only to U.S. commercial banks. It excludes foreign commercial banks including those in London who may dominate base metals activity. And it excludes all investment banks like Goldman Sachs or Morgan Stanley or Merrill Lynch, wherever they may be domiciled.

So that above portrayed giant mountain of U.S. commercial banks commodity derivatives that has mushroomed in recent years is only a fraction of the total such expansion that has emerged over this period. We are talking of a magnitude in the many trillions. Cut this total down for all kinds of double counting. You still have an unimaginable mountain of fund flows into commodities.

There can be no doubt these flows have been too large for the commodity markets. At the price levels of years ago, which were far closer to marginal cost, all the commodity inventories in the world totaled in the hundreds of billions of dollars. Most of these are "working inventories" which speculators could not buy and hold. Compare this to the outstandings of global equities and fixed income instruments, each of which are in the many tens of trillions of dollars, most of which are "publicly" traded.

So the commodity markets have not been large enough to accommodate the tsunami of fund flows of recent years. So how have these fund flows been accommodated?

Only by an explosion in commodity derivatives, as the physical stocks are too small. Prices of spots and forwards have been pushed way, way beyond marginal cost in order to induce commercials to hedge via derivatives more and more of their above ground stock and, more importantly, more and more of their future production.

In the past, when commodity prices spiked the forward prices remained low as all market participants rationally expected an eventual reversion to mean or marginal cost. Not so in this cycle. The pressure of financial flows has been so great that it has pushed futures and forward markets up relative to the spot. Typically, at marginal cost commodity markets are in a slight forward discount or backwardation, and that "back" becomes very steep at high prices. In this cycle most markets are now in contango at very high prices and, more and more, they are moving for the first time ever into contangos that exceed the cost of carry (super contangos).

What is the source of this huge financial pressure? Some say pensions and endowments who have begun to "diversify" into commodities. Some say hedge funds who have taken a shine to the star performing asset class of this cycle. Some say to these we should add high net worth individuals and doctors and dentists and other retail investors who have joined the party.

To my mind the role of pension and endowment purchases of baskets has been greatly exaggerated. Something more than $100 billion globally is in these baskets. That is not large compared to the many hundreds of billions or even trillions of commodity derivates (net of double counting) that we know are out there. And if the prime mover of commodities were these baskets all boats would be floating. But they are not. They were

in 2003 and early 2004 (when the baskets were much smaller). But since then most commodities have left the bull market, at least for a while, even though all are "equally" represented in these baskets. Some like soybeans and natural gas have crashed despite this supposed tsunami of fund flows into commodity baskets. No. Whatever the source of these massive fund flows, basket buying must play a lesser role.

To my mind, that leaves hedge funds as the prime mover. They allegedly now have $1.7 trillion in assets which they leverage. Now we are talking about a resource pool in the many trillions. It is easy to see that a ten percent exposure would leave the commodity baskets in the dust.

Let us now turn to the base metals. With the significant decline in the commodity indices in Q3, the prices of almost all commodity groups are at or below the levels of last summer. There is only one major group that is higher – metals. And they are much higher. Some like copper and nickel and zinc are much, much higher.

Why, you ask? The above provides the answer. Hedge funds who, for whatever reason, have taken a shine to metals.

With this over view behind us, let us now become more specific.

First, I will focus on the shorter run. I am going to argue that the odds are the commodity bull market has ended. Metals remain relatively strong. I will then give my reasons: hedge fund buying to the point of manipulation. Then I will suggest a scenario whereby this hold out group will join the fold of fallen and falling commodity prices.

After these suggestions I will address supply/demand and the dynamic processes whereby the base metals markets will revert to mean. It is here that we will realize a nuclear winter lies ahead for the base metals.

The Natural Gas Fiasco

Around June of last year I began to receive reports of a manipulation in base metals. They came from many sources, including the biggest dealers in the business. And in some cases from very high ranking people in those houses.

As the months passed more and more reports flowed in, some from the same sources, some from new sources.

As the months passed, for such reports to be true, the scale of the manipulation had to be bigger and bigger. By early this year the scale of what was happening, if anything was happening, pushed the bounds of all credibility.

I discussed this matter with a friend last November who I cannot name. I can only say that he is well positioned in the world of U.S. commodity futures markets. He knew nothing of manipulation in base metals. But he did say to me that three hedge funds in

collusion intended to squeeze the price of natural gas that winter. The natural gas price at the time was $10. Their target was $25. He knew personally the perpetrators who apparently were quite public regarding their intentions. All he would say is that one of them had been a chairman of the NYMEX and was now running a hedge fund.

Towards the end of the year the price of natural gas went to $16. I wondered if the manipulators were succeeding.

Then suddenly the weather in the U.S. northeast turned abnormally warm. The demand for natural gas fell well below its seasonal average. Soon it was clear that there would be only a limited drawdown of natural gas in storage and that the natural gas utilities would have too much natural gas in storage at the end of the drawdown season. This collapsed the spot price of natural gas. I wondered at the time if the planned manipulation by the three alleged perpetrators had left them with big losses.

Several months later I noticed on my Bloomberg that a U.S. consumer group and various public officials were investigating an alleged manipulation of U.S. natural gas. I tracked down the consumer group. They had written a paper providing evidence in this regard. Apparently the attorney generals of four states responded and pressed for investigation of this alleged manipulation. Apparently some members of the U.S. congress also took up the issue. But this consumer group told me that all the parties involved had neither the technical expertise nor the funding to push forward and that the U.S. regulatory agency – the CFTC – refused to look into the matter in an adequate fashion.

Many months passed. Then, at the end of August of this year, I was told that several hedge funds had taken large losses in natural gas. Soon it surfaced publicly that a hedge fund named MotherRock lost more than all its assets due to a failed natural gas trade. The head of this hedge fund was Bo Collins, a former chairman of the NYMEX.

On reading this a light bulb went on in my brain. In November I was told that this man was colluding with other hedge funds to rig the natural gas market. I wondered, would more bodies come to the surface?

And low and behold a whale of one did. Shortly thereafter the $9.8 billion dollar hedge fund Amaranth reported a $5 billion dollar loss in something like five days.

The initial story that made it into the public domain was that Amaranth purchased a natural gas spread trade from the failed MotherRock and then took further losses. But that clearly made no sense. To lose $6 billion dollars in natural gas in a few weeks on a spread trade required a spread trade with a face value that was almost equal to the entire value of the NYMEX open interest. Of course such a trade would have been done over the counter, since NYMEX position limits would never allow anything like it. But a spread trade of that magnitude still seemed questionable.

And certainly such a spread trade could not have been purchased from MotherRock. MotherRock had only $400 million in assets. There is no way it could have acquired a spread trade with a face value in the tens of billions of dollars.

So the real story must have been different than these early accounts.

Since then we have heard that Amaranth took a loss of $7.0 billion dollars, with perhaps more to come as they proceed to liquidate. There is one report in the public domain that Amaranth was leveraged 4.5 to 1. By some accounts the vast majority of its gross assets were in natural gas positions. Apparently its natural gas positions were responsible for its profits for the last two years or more.
Whatever its position was (perhaps a combination of far forwards, call options and spreads, I am told) to lose $6 billion in weeks implies a net long gross exposure of several times that loss. By contrast all the commodity baskets in the world have assets of only $100 - $140 billion and their U.S. natural gas positions amount to perhaps only several percent of that total. So one single hedge fund – Amaranth – had a "long" position in natural gas derivatives that was several times the overall exposure of all the commodity baskets out there.

This was with natural gas in a downtrend. Imagine how much hedge fund company Amaranth must have had when natural gas was soaring. I believe the Amaranth incident makes it clear; hedge fund positions in commodities derivatives absolutely dwarf those of the commodity baskets.

Lastly, we must ask, why would one hedge fund take on such a huge position in one volatile commodity?

One can only speculate. Consider the following as a possibility. One hears that Amaranth's position was in the far forwards. These markets are thin. If you throw enough money at them you can push them around. And in doing so you can manufacture "mark to market" profits. It may be that something like this was going on. Until a weakening physical market and speculators on the short side brought it to an end. In any case, when it ended the price of forward natural gas and the assets of the hedge funds involved fell violently.

A Possible Parallel Event In Base Metals? Or More?

Since the hedge fund fiasco in natural gas there has surfaced as well more and more commentary about hedge fund "games" in the base metals. I hear a great deal of it through the "grapevine". But some of it makes its way into the public domain. It involves reports of hedge funds hiding physical metal to create an artificial "scarcity" and hedge fund positions in the forward markets that may be so big as to allow "manipulation" of forward prices.

Let me present a sample of such reports.

"The opinions of metal traders and mining equity traders are diverging. Who is right? There have been occasions in the past when mining equities have been quite 'distrustful' of positive metal trends and then subsequently had to eat humble pie and 'catch up'. Currently, it is the metals universe that appears to be somewhat 'stubborn' in its reaction to poor trends in economic series such as the poor trend in global order books evidenced in the recent release of our global PMI Index. The explanation to this probably lies in the fact that the metals community tends to focus on the positives of supply disruption rather than worrying demand trends at this stage of the cycle. To be fair to the metals community, it is not irrational to delay a price reaction until poor demand is evidenced in rising metal inventory. The challenge with that thinking at the moment is that there is currently more than the normal level of concern in the market that there may be a deliberate 'hiding' of inventories. That cannot be held up as a hard fact however. Conversely, declining order books are a hard fact. If there are inventories being hidden, declining demand will eventually be too strong a trend for the 'hiders' to take on a sharply growing surplus as personal inventory. At the point at which it is no longer feasible to accumulate inventory, existing 'hidden' inventories will be released and visible inventories will rise disproportionately faster than underlying demand/supply imbalances. Again, none of this can be proven but if there are those out there holding hidden inventory, they will be hoping right now that order books move upwards again in the near future."

'A Major Dealer I will Leave Unnamed'

"There are signs of softness in housing and motor manufacturing, but in other areas the situation is harder to read for the moment," said John Kemp, analyst at Sempra Metals.

"Copper seems expensive at 7500. But the major hedge funds ... have demonstrated their ability to keep the market tight by buying up all the stock in recent days."

John Kemp,Sempra Metals, September 27, 2006

These funds have enough capital to keep the market short for the next six to 12 months and that is why upcoming wage talks, the possibility of strikes disrupting supplies are a major worry for consumers, analysts said.

Bloomberg News, September 2006

Demand for copper fell by 2 per cent in the first half of 2005, according to Nick Moore, commodities analyst at ABN Amro.

Fingers are thus being pointed at the hedge fund community. "This is window -dressing ahead of the end of the quarter. The funds are going to try to hold the price up," said Mr Moore.

Nick Moore, ABN AMRO

"This is all fund buying; that is all it has been," said an analyst at Natexis Metals. "The hedge funds are self-fulfilling; they create the momentum and then they run along with it, and they were pushing the market to test the previous high."

Bloomberg News, September 2006

I cannot prove that there is an "operation" in base metals that is as great as or greater than the hedge fund operation in natural gas that has recently surfaced. Though I got advance reports of this natural gas "escapade" from the "marketplace" and though such "escapades" made it to consumer groups, to the offices of state attorney generals and to the U.S. congress, I believe it was far less rumored and discussed than the rumored manipulation in the base metals.

The only good data on base metals is on primary supply. Of all the commodity groups this data shows the strongest supply growth. Primary supply in metals is growing 5% to 10% a year, which is two to four times trend.

In base metals our official data on demand is in large part derived. We can count up all the output of the limited number of smelters and refiners around the world and thereby estimate supply. But we cannot count up all the primary metals put into use by all the primary processors around the globe because they are too numerous, too small, too diverse, too "private" in many cases.

So how do we calculate demand? Indirectly. By taking the primary production in most countries and adding net exports (imports minus exports) and adjusting for the change in visible stocks. But our data on visible stocks around the world is of very poor quality. Data on stocks at fabricators is almost non existent. On producer stocks it is less than desired. Merchants hold vast stocks. And they don't tell anyone their positions. And if speculators hold physical stocks no one knows the details.

So our data on global metals demands are "derived" from our supply data. In large part our "concept" of demand is one of "apparent" demand, not real demand.

Currently the official data on base metals shows demand growth for a few base metals in the past three years that is very high relative to trend. This is suspect. All metals exhibit some price elasticity. The "real" rise in base metal prices in this cycle is greater than in any cycle since the 19th century. There should be some price rationing of demand. The odds are that, by now, demand growth is less, not more, than trend.

So why the strong demand data? The answer is simple: a build of hidden stocks. Our only good data is about the booming supply. Our demand data is that very data on supply, adjusted for stock changes, most of which are not reported.

From this I conclude that the constellation of data on supply and demand for base metals points to a high probability of hidden stock builds. Some of that may be inventory building by commercials. But some of it may be by speculators, taking metals off the market to engineer classic age old squeezes which have always been part of the base metals cycle.

Some of the "official" data on metals markets like copper and lead suggest surpluses despite the possibility of hidden stock builds which would tend to depress any reported

surplus. Others appear close to balance and would be in surplus if there are hidden stock builds. On balance the data is consistent with hedge fund "inflation" of metals prices.

Persistent sky high prices of metals will tend to ration demand further and encourage supply further, thereby increasing surpluses. The weakening of the all important U.S. housing sector will also tend to undermine global demand growth. Over time surpluses should rise. If hedge funds have been managing base metals prices, eventually these funds and the base metals should go the way of Amaranth and Bo Collins and the natural gas price.

I believe the odds are high there will be more hedge fund accidents forthcoming due to "shenanigans" in the base metals sector. As far as the short run is concerned, I believe it is the activities of these funds and their eventual failure that will determine the price break that begins the inevitable deep decline back to marginal cost for this complex.

The Longer View: The Supply Response

The consensus view is that eventually base metals prices will fall, but they will remain higher for longer in this cycle – and we will never again see the price levels that prevailed at the beginning of this decade. For the consensus the reasons for this are obvious. First we are in a grand new supercycle of demand growth due to the ascendancy of the Chinese and Indian economies onto the world stage. Second, we are in a world of relative resource scarcity in which, for many reasons, the base metals supply schedule simply will not shift outward as readily as it did in the past.

As regards what I call the myth of the demand supercycle, I have addressed this time and again (see my Veneroso's Views at www.goldnewsletter.com). I believe one simple salient fact demolishes this myth. If you look at the official data on base metals over the decades you will see that, on average, growth in base metal demand tends to be less than global GDP growth, and by a little less than a percentage point a year. Citigroup took a composite of all base metals and calculated that, for the period 2000 – 2005, the growth in base metals demand was less than global GDP growth by 1.5 percentage points.

This is a "lousy" demand trend – one of the worst periods on record. This multi year poor demand trend persists despite extraordinary demand growth for some base metals in just one or several of the most recent years, as mentioned above. For example double digit growth in nickel demand this year follows no demand growth in 2005. Of course, some metals have exhibited very weak demand growth in the official statistics – for example, there has been virtually no demand growth in copper since the end of 2004. And less than 2% annual demand growth over the last seven years.

There is no excuse for this feeble half decade demand trend. Overall this was a period in which the global economy swung from recession to synchronized boom. If anything "intensity of use" rises on the upcycle as fixed investment and inventories, which have high base metal contents, rise as a share of global GDP. And despite weakness in first

world economies in the first years of this period, it was a period throughout which the economies of "Chindia" were in rapid expansion.

We can quibble about exactly how to interpret this global base metal demand data over this period. But there can be no doubt that, based on this historical record, there is no sign of a new secular supercycle for global base metals demand.

Let us now consider supply. I make the simple observation that primary supply in base metals has now accelerated to 5% to 10% rates across the sector. And I believe that some of the apparent constraints in official primary supply data is misleading. For example, though supply growth in copper was 4% plus in 2005 and lifting to 6% plus, which is two times trend, it has been this low only because the capacity utilization rate of global copper mining has fallen to a multi year low. There is clearly no shortage of capacity.

People do not believe this incontrovertible fact; there are many reasons this time around for supply constraint, it is claimed. I believe these reasons for these claims are utter "hogwash". You can make such claims for global oil or global gold. You might be right, you might be wrong, but the thesis has merit. Not so for base metals.

To settle the issue one must focus on the particulars, because it is an industry specific issue in the end. In this regard it is useful to focus on one market that seemed supply constrained just months ago and now is on the verge of glut – alumina.

Below I present the alumina story. Perhaps it is the extreme case among base metals, but I believe it provides some powerful myth destroying evidence.

Alumina: The Coming Tsunami of Supply

The input to alumina production is bauxite. It is ubiquitous clay. Production expansions are easy. The production constraint has been the facilities that convert it into alumina.

The world produced about 56 million tonnes of alumina last year. China's contribution to this total was 8.5 million tonnes.

In various reports over the last 6 months I have reported that there should be no problem in expanding alumina production globally. It only takes 18 months to build an alumina plant and get it on stream. China has embarked on many new alumina projects. From what I could tell Chinese alumina production this year would be up about 50%.

As China accounted last year for about 15% of global alumina production its expansion this year alone would add more than 7% to this year's global supply. That is almost three times the trend rate of growth of alumina supply/demand. It was more than the most optimistic forecasts for increases in aluminum demand globally. As there are many alumina production expansions outside China it seemed clear that the bottleneck in alumina would soon be overcome, reducing dramatically the cost of production of aluminum and thereby the price of aluminum.

Nick Moore, metals analyst at ABN AMRO, did some interesting work on alumina in this regard. He compiled a list of all the alumina projects in the pipeline in China. Below is his compilation.

Table 11 : China's alumina expansion projects

(000t)		End-2005	Added in	Future	2006	2007	Post-
Company	**Location**	**capacity**	**2005**	**expansion**	**addition**	**addition**	**2007**
Chalco Henan	Henan Zhengzhou	2,300	700				
Chalco Zhongzhou	Henan Zhongzhou	1,500	400	150	150		
Chalco Shandong	Shandong	1,300		440	440		
Chalco Guangxi	Guangxi Pingguo	900		880		880	
Chalco Shanxi	Shanxi Yuncheng	2,200	800				
Chalco Guizhou	Guizhou Guiyang	900		400		400	
Chalco total		**9,100**	**1,900**	**1,870**	**590**	**1,280**	-
Guangxi Huayin	Guangxi Debao			3,200		1,600	1,600
Kaiman Sanmenxia Al	Henan Sanmenxia	300	300	900	300	300	300
East Hope Sanmenxia	Henan Sanmenxia			1,200	400		800
Yimei Group Yixiang Al	Henan Sanmenxia	200	100	400	400		
Wanji Xiangjiang Al	Henan Xinan			1,200	400		800
Zhongmei Al	Henan Dengfeng			1,200		400	800
Huiyuan Chemical	Henan Lushan	300	200				
Baofeng Shenhuo Al	Henan Baofeng			1,050			1,050
Nanshan Group	Shandong Longkou			2,100	400	300	1,400
Chiping Xinfa Huayu Al	Shandong Chiping	600	600	1,400	400		1,000
Luneng Jinbei	Shanxi Yuanping			2,000	1,000		1,000
Yangquan Coal	Shanxi Yangquan			800		400	400
Shanxi Tongde Al	Shanxi Baode			1,000		300	700
Shanxi Wusheng Al	Shanxi Yuncheng			600	300		300
Shanxi Feimei Al	Shanxi Jiaokou			800	300		500
Guizhou Kaisheng Al	Guizhou Kaili	50	10	300			300
Guizhou Zunyi	Guizhou Zunyi			800			800
Guizhou Wuchuan	Guizhou Wuchuan			400			400
Mengxi High Tech	Inner Mongolia			400		400	
Chongqing Bosai	Chongqing Nanchuan	150	80	300		300	
Dingtai Tuoyuan	Chongqing Wulong			300	150	150	
Yunnan Metallurgical	Yunnan Wenshan			800			800
Non-Chalco total		**1,600**	**1,290**	**21,150**	**4,050**	**4,150**	**12,950**
Industry total		**10,700**	**3,190**	**23,020**	**4,640**	**5,430**	**12,950**

Source: China Metals

Nick noted that up to this year the big state aluminum company Chalco accounted for almost 90% of China's alumina production. But going forward it appears that non Chalco projects, largely under the control of the provincial governments, would account for over 90% of the future increment to production.

Nick's compilation of over 23 million tonnes of new alumina capacity in China is enough to quadruple China's total alumina output. This increment alone would represent a 40% increase in global alumina capacity and production. With a past trend rate of growth in alumina demand of less than 3%, this increment would probably provide a capacity expansion for the whole world that would suffice for more than a decade. It only takes 18 months to bring on an alumina plant in the West. So this entire increment could possibly come on stream in only a few years. If that happens it will quickly create a vast glut of capacity in alumina globally.

Of course China is not the only place where alumina capacity is being expanded. The sky high alumina price in 2005 and early 2006 has set into motion many other capacity expansions. Should they come on stream the global glut will grow even larger.

How Fast Is Alumina Capacity In The World Expanding?

Nick Moore made what he thought was a realistic assumption: the planned capacity expansions in alumina in China that he compiled would on average be delayed by a year. With this assumption in hand he predicted this past May a 22% increase in Chinese alumina output in 2006. He forecast that this would raise Chinese alumina production from 8.5 million tonnes to 10.5 million tonnes. This would help ease the global alumina shortage, but not dramatically. The alumina price, over $600 a tonne early this year, would still average over $550 a tonne for this year overall.

Table 14 : Aluminium and alumina price forecasts

	2000	2001	2002	2003	2004	2005	2006F	2007F	2008F
Aluminium price	1,548	1,444	1,349	1,431	1,715	1,900	2,640	2,530	2,310
Spot alumina price	308	155	149	273	404	453	564	411	353
Spot alumina price as % of aluminium	19.9%	10.7%	11.0%	19.1%	23.6%	23.8%	21.4%	16.2%	15.3%

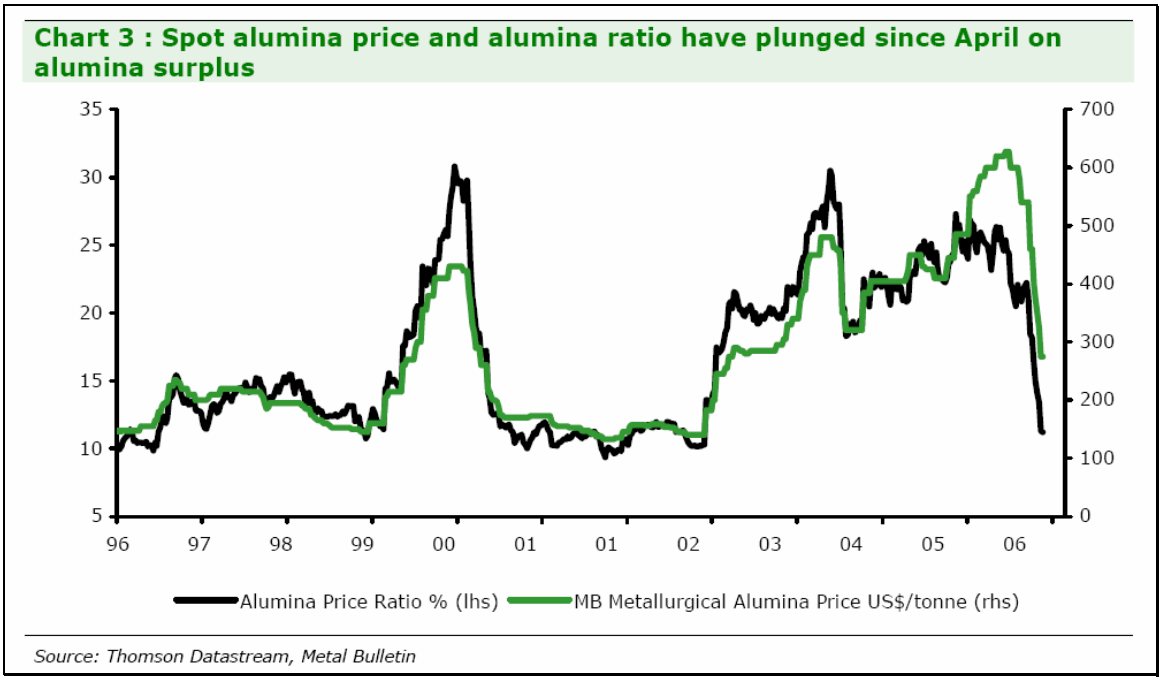
Source: Datastream, ABN AMRO forecasts

In July China reported that its alumina production was up 50% year over year. Apparently capacity was coming on stream faster than Nick Moore forecast.

China has recently published the numbers for alumina production through the first 8 months of this year. Apparently production growth is accelerating: production growth is now up 57% through August versus the same period a year ago. That implies that the growth rate of production year over year in July – August was much greater than 57%.

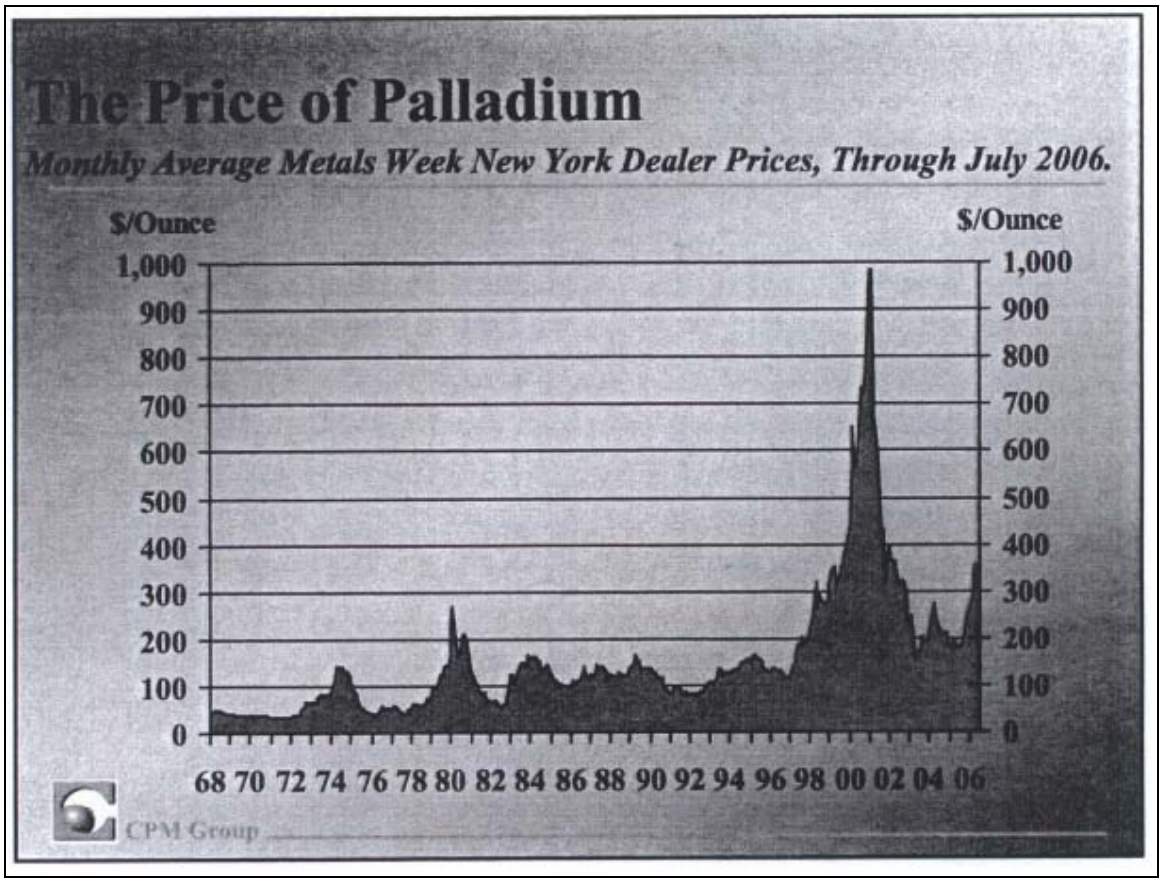
A 57% increase in Chinese alumina production is, all by itself, huge on the global scene. It alone increases global alumina supply by more than 8%. That is three times the trend rate of supply/demand growth. That is more rapid than even the most bullish prevailing estimates for growth in aluminum demand this year.

One might think that this would glut the aluminum market. Apparently it has. Suddenly this summer the alumina price collapsed from well over $600 in the spring to $270 by early September.

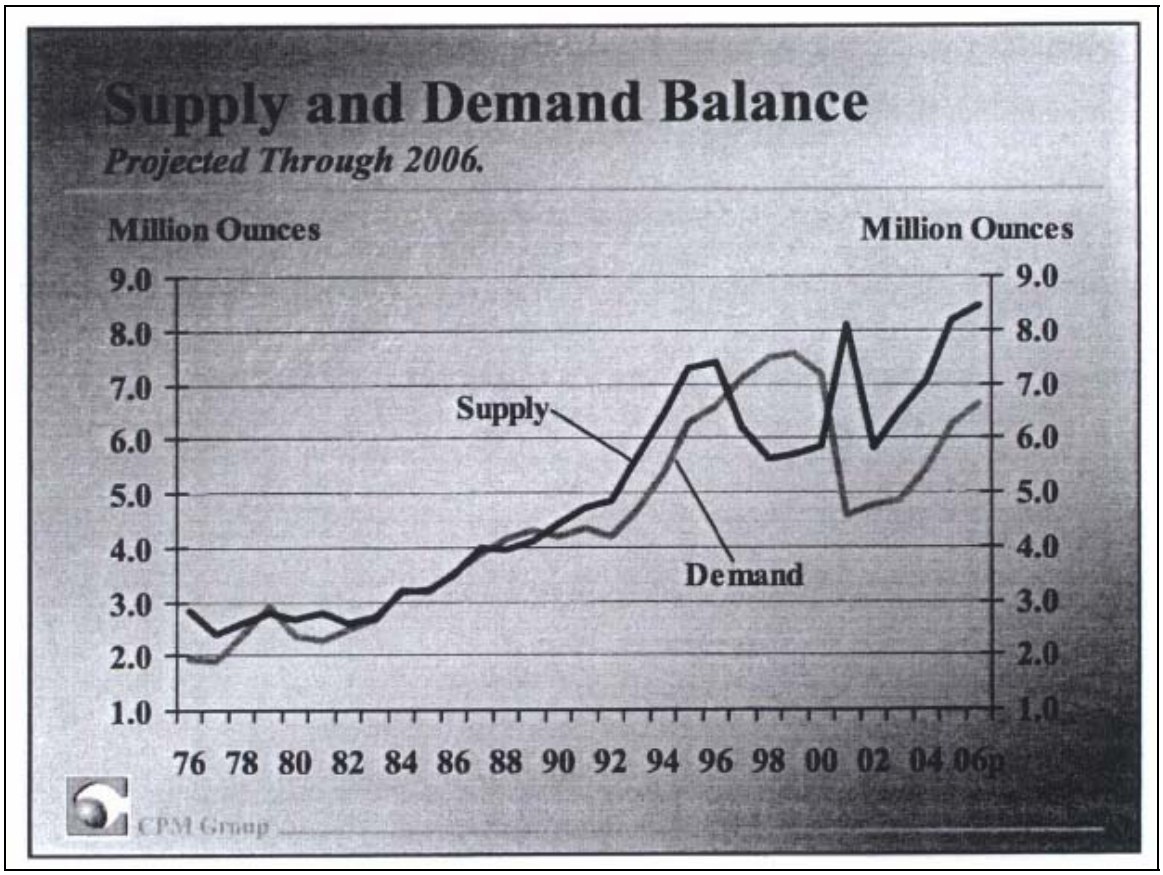


The Adverse Long Run Impact Of Price Spikes On Supply/Demand
The Case Of Palladium

At the end of the 1990's all metals fell to extreme price lows. But there was an exception. Palladium. Here an alleged hedge fund squeeze created a massive price spike while all other metals prices were low.



This price spike was extraordinary, though brief; yet it has had a remarkable long term impact on supply demand. Jeff Christian of CPM Group provided at a recent Hong Kong conference the following chart which illustrates this.



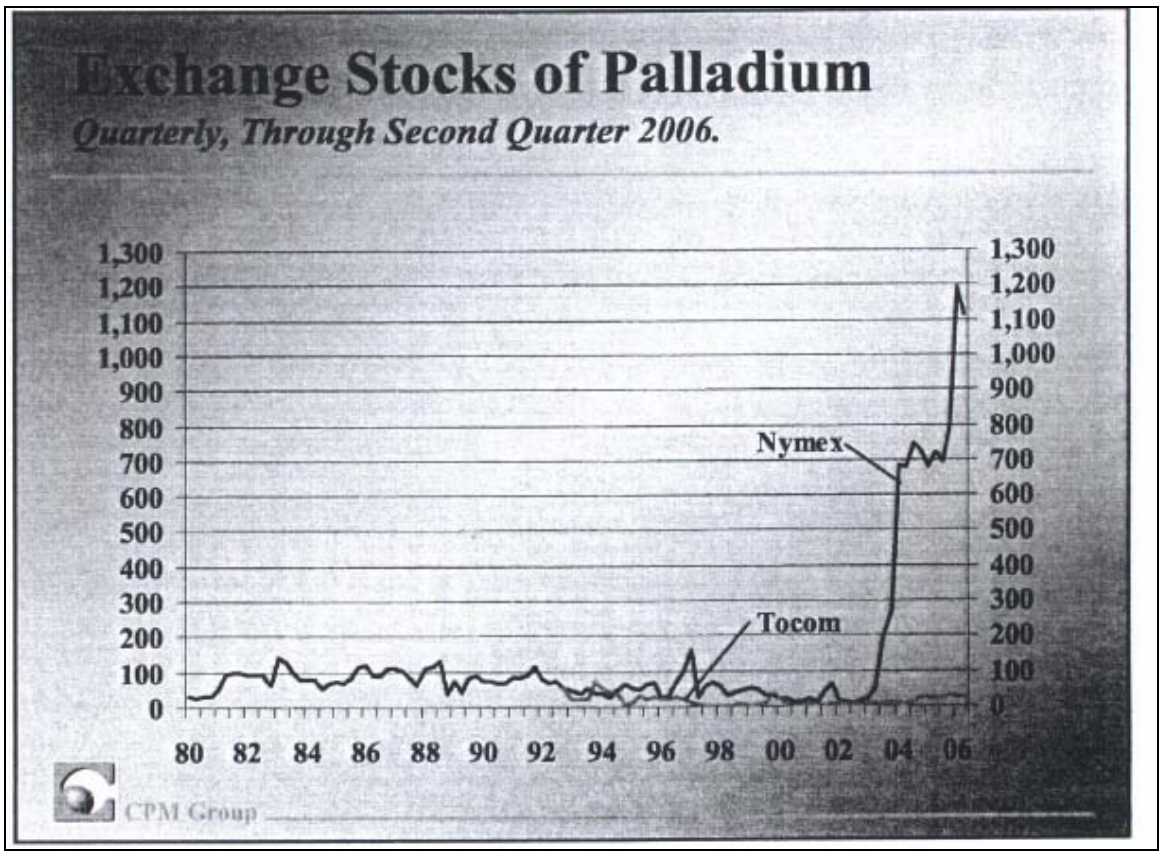
We see in this chart that this price spike severely rationed demand and encouraged supply. Suddenly the market went into a massive annual surplus of 3 million ounces on an annual demand of only 5 million ounces. Such a surplus is unheard of in the history of commodities.

After the price crashed back toward the lows of the mid 1990's, this surplus narrowed, but not by much. Jeff calculates that the palladium market is still in a huge surplus – equal to 15% or 20% of demand. Such surpluses simply do not happen in commodities. This one has persisted for half a decade.

Since mid 2006, along with all other metals, the palladium price has soared despite a giant annual surplus and the accumulated large surpluses of half a decade.

In all metals there are long lags between price signals, on the one hand, and demand and supply responses, on the other. The supply/demand balance today reflects the commodity price of perhaps two years ago on average. The average palladium price was much lower then than it is today. Therefore, we can expect that, as the lags run their course, the surplus in palladium will grow even larger.

The second point Jeff brought up that is noteworthy is that the stocks of palladium on the NYMEX and TOCOM have soared and soared and soared (Check the chart below). I never thought I would see such stocks on NYMEX. They attest to the existence of a large surplus.



More Evidence Of The Hedge Fund Metal Mania

In all metals merchants in the past have accumulated hidden stocks. As I have discussed above dealers believe that hedge funds have accumulated hidden stocks in this cycle. So it is very striking to see in palladium this enormous increase in visible exchange stocks. How is that?

Remember there has been a vast surplus in the palladium market for more than five years. The palladium price has risen nonetheless. This gravity defying phenomenon can be explained only by massive buying by speculators. It is my guess that taking on such a large cumulative surplus has been so daunting that some metal has made its way on to the exchanges.

Jeff Christian has stated that 3 hedge funds own all of the exchange stocks and are the dominant longs on NYMEX. But, remember, most hedge fund positions today reside over the counter. And there must be huge stocks of physical palladium outside the

exchanges, given the accumulated 6 year surplus. So the overall positions of these few funds in futures and forwards and physical must be far larger than Jeff indicates.

In any case, palladium is an illiquid market. If palladium is in such a surplus, and if 3 (or many more) hedge funds own such a large physical and futures position – "THEY CANNOT GET OUT". You can't sell such a big position into a market in huge surplus except at the most abysmal prices.

If the palladium market is in such a large surplus and the price remains high – as it has – someone must be buying up that large and probably growing surplus. Illiquid positions must be getting larger and larger. If the surplus grows the size of these positions must accelerate.

One must ask, why would hedge funds put themselves into a position which they clearly cannot get out of?

I don't have a definitive answer, but I have my suspicions. In any case the example of palladium makes it clear that hedge funds will take on positions in metals markets of a size that exceeds the comprehension of anyone who has known the history of these markets.

On Toward The Coming Nuclear Winter In Base Metals

Let me reiterate some key points.

Data from the US OCC on commodity derivatives tells us that there has been a totally unprecedented flood of speculative and investment funds into commodity derivatives in this cycle. This flood and not fundamentals explains why, in real inflation adjusted terms, commodity prices have risen more in this five year cycle than in any time since the onset of the industrial revolution two and half centuries ago.

The Amaranth natural gas incident makes it clear that it has been hedge funds and not pension and endowment purchases of commodity baskets that have been most responsible for this tsunami of funds and the subsequent commodity price bubble.

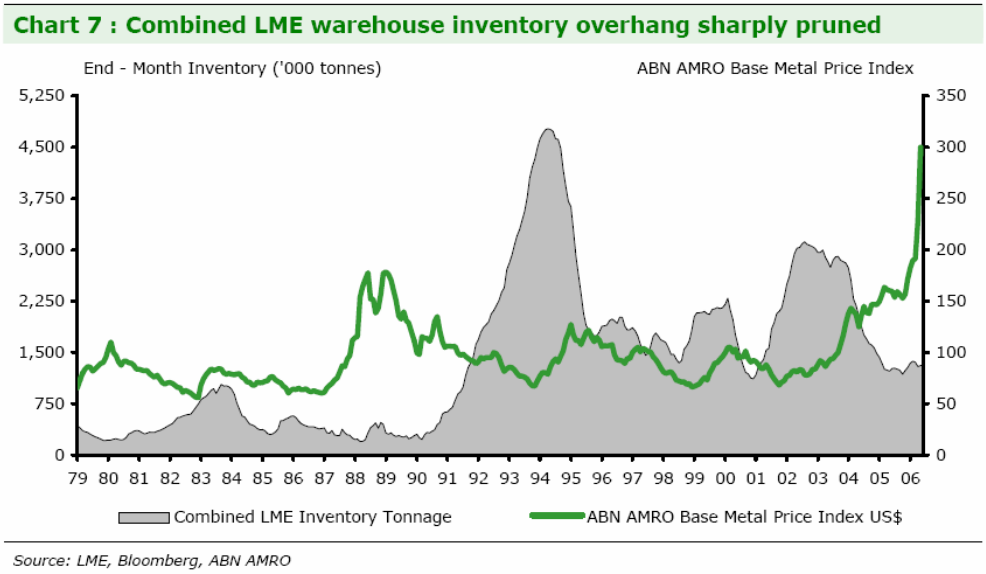
Our example of palladium makes this same point about hedge fund domination – only far more starkly. It also shows that huge commodity price spikes can dramatically shift supply demand balances into huge surpluses that will last for years.

Lastly our example of the alumina industry underscores the potential for overwhelming supply responses to metals price spike in the current environment.

Most analysts and investors believe that the huge rise in real commodity prices in this cycle reflects a new era of supercycle demand growth and constrained supply, and therefore high prices will prevail for a long time. What they do not realize is that commodity prices are goods of use governed by the laws of micro economics and that a

giant price rise, as we have had in metals, will inevitably create overwhelming surpluses. That is not apparent now because the generation of these surpluses and the subsequent accumulation of mountains of inventory takes a long time. I might also add that, in some metals, this process may be underway but not visible because of hedge fund and possibly merchant accumulation of invisible stocks.

Let us consider these all important lags. Below is a chart from ABN AMRO presenting more than 3 ½ decades of data on base metal prices and LME base metal warehouse inventories.



What we see in the above chart is that LME base metal prices peaked in 1980, again in 1989, and again in 1995. In all of these cases these markets soon went into surplus. These surpluses expanded despite falling prices, and metal inventories soared for many years. The peak in these metal inventories typically has occurred four to six years or more subsequent to the price peak.

Why has there been this long lagged response of the stock of inventories to metals prices? There are several reasons, but 2 predominate.

First, it takes a long time for the high price signal to result in the curbing of demand and the encouragement of supply, leading to greater and greater surpluses. Why? Largely because substitution and economization, which curb demand, requires decisions to economize and substitute. That take time. It must then be followed by the building of new capital equipment, which takes yet more time. In fact, the diffusion of such decisions and the construction of alternative production processes takes many years.

The same is true of the supply responses. For expansions and restarts of closed mines the lag may be only a year or two. For the construction of new mines it can be four or five years or more. Hence the supply response goes on and on for half a decade once the price signal occurs.

Because this demand and supply responses require capital investment which has along gestation and "sunk" costs, these responses which lead to surpluses continue to run their course even after metals prices fall.

There is a second important factor that results in this roughly half decade lagged response of metal inventories to the high metals price signal. Usually metals prices peak late in a business expansion. Typically a business downturn follows. It need not be a turning of a US business expansion or even a global business expansion. All one needs is a serious softening to one important part of the global economy. That business downturn takes the edge off demand growth at a minimum.

Super imposing this macroeconomic depressant on a shifting balance in supply demand due to micro economic forces adds to this long lagged response of the eventual mountain of inventories to the metal price peak. In the early 1980's we had a global recession that was severe. That contributed to an inventory peak that crested in 1984.

In the late 1980's we had a metals price peak that was followed around 1994 by the peak in the mountain of inventories. Here the world experienced a rolling recession. It started with a mild recession in the US and it was followed by subsequent recessions in Europe and Japan as the US was recovering.

In the half decade that followed the US and European economies kept growing but the Asian economies beginning in 1997 faltered badly. This contributed to a rise in inventories by 1999. When the US joined Asia as a contributor to global economic weakness inventories climbed a new high mountain into the very early years of this decade.

So the historical record suggests that a combination of demand rationing and supply encouragement, after a long lag, coupled with a high probability of some economic weakness somewhere in the world, inevitably leads to a sustained surplus and a mountain of inventory which takes metals prices down for many years until just before the mountain of inventory itself peaks.

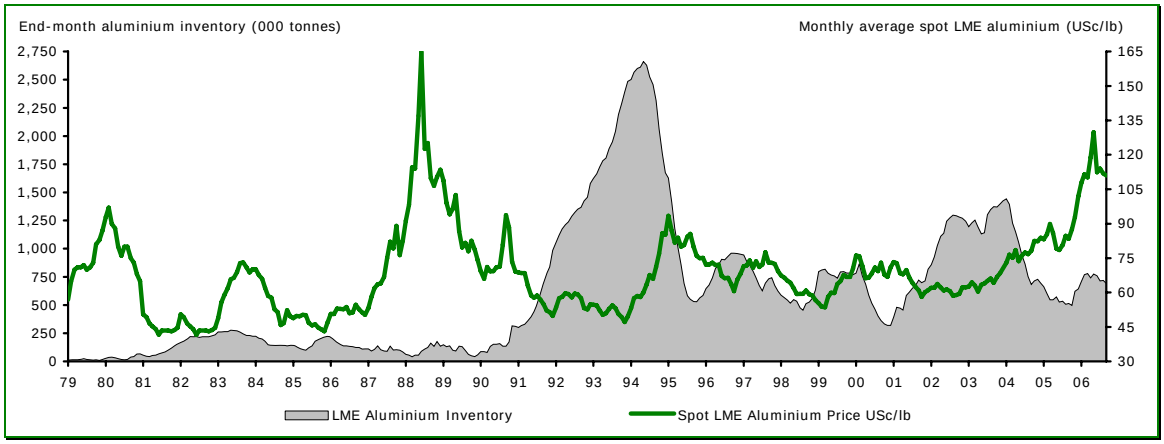
Now let's look closely at the metals price cycle on the above chart. What we see is that, when metals prices rose the most in percentage terms, the subsequent accumulated surpluses and inventory mountain was all the higher. Most striking is the late 1980's.

Then there was a tripling in base metals prices. An absolutely enormous inventory mountain occurred a half decade later.

This correlation suggests that, over time, the higher the percentage gain in real commodity prices, the greater will be the subsequent accumulated surpluses and inventory mountain. This price correlation of course is not the only reason for this LME metals inventory mountain by 1994. At about that time, with the collapse of the Soviet Union, Soviet state held hoards of metals began to make their way to the West. But the

odds are that the dramatic (percentage) increase in metals prices it the late 80's had something to do with the height of the early 1990's inventory mountain.

Inspection of some individual metal commodities tends to support this view. Below is a comparable chart for aluminum. In the late 80's, under a famous squeeze engineered by Marc Rich and Manny Weiss the aluminum price increased almost four fold. It was the metal that experienced the greatest price rise in that cycle. The aluminum price in nominal terms has never approached that dizzy price peak of 1988.

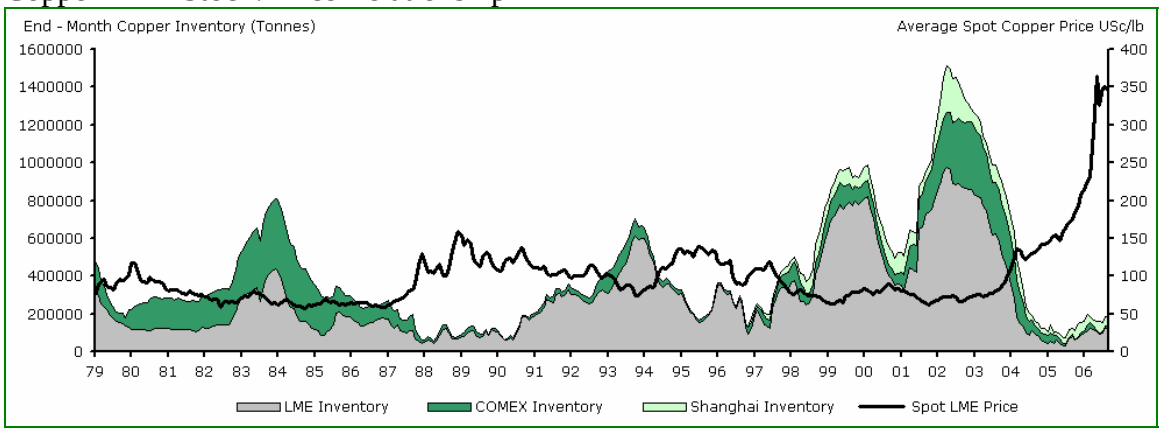


Nick Moore, ABN AMRO, September 27, 2006

What we see in the above chart is that that greatest percentage price spike in aluminum in decades was followed by a record of aluminum inventory over the next period. Yes, Russian aluminum supplies contributed to that inventory explosion, but the odds are that there was a correlation between the size of the price rise in the late 1980's aluminum bull market and the subsequent surpluses and inventory mountain.

Let us look at another individual commodity. Copper.

Copper LME Stock: Price Relationship



Nick Moore, ABN AMRO, September 27, 2006

In this case we see huge accumulated surpluses and a huge inventory build into the very beginning of this decade. This was not preceded by a giant price spike in percentage terms like we see above in aluminum or like we saw earlier in palladium. But it was preceded by an artificially elevated copper price over a half decade.

Throughout the early 1990's Hamanaka and Winchester manipulated the price of copper. Without this speculative activity the copper price would probably have fallen well below a dollar and stayed there for years, much as it did in the 1980's. Instead the speculative activities of these "squeezers" kept the copper price well above $1 for years.

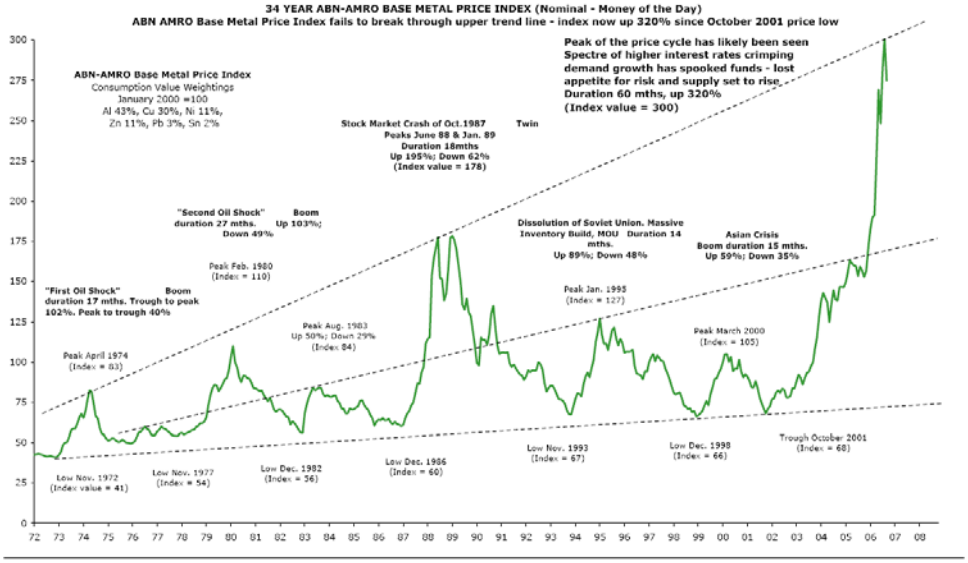
To do this they held metal off the exchanges in hidden stockpiles. This metal eventually made its way into visible stocks contributing to the eventual inventory mountain. But, more importantly, that highish copper price over that multi-year period of the mid 1990's encouraged a boom in copper mining. Supply growth was high for years to follow, even though the unwinding of the Hamanaka/Winchester squeeze and the Asian economic crisis took the copper price down. This long lagged response in supply contributed to the great inventory mountain at the turn of the decade.

So inspection of the correlations between metals prices and exchange inventories suggests that manipulation of base metals prices to artificially high levels leads eventually to exceptionally large surpluses and exceptionally large stockpiles. The events of the palladium market over the last six years tells us the same thing. But these supply and demand responses and eventual inventory mountains can take many years. But once they happen prices fall and fall as inventories rise and rise.

Now For The Nuclear Winter Prospect

In the above chart on combined LME inventories, we see that both the nominal and real price spike this time is greater than it has ever been. Here is another version of that chart.

Chart 16 : 34-year ABN AMRO Base Metal Price Index (Nominal – money of the day)



Source: LME, and ABN AMRO

Winds of Change, Nick Moore
ABN AMRO September, 28, 2006

In this cycle LME metals prices have risen roughly five fold versus a three fold rise in the late 80's. Inflation was higher in the late 80's than it has been in recent years. So in real inflation adjusted terms – which is what matters – the price spike this time has been even larger.

The situation is even more dramatic for certain individual base metals. In the late 1980's the copper price rose 2.5 fold in nominal terms. In this cycle it has risen 6.5 fold. Bob Hoye did a very interesting calculation on increases in the real inflation adjusted copper price since 1900. For all the cycles since then (but prior to this last cycle) the copper price never rose by more than 3 fold in real terms. In this cycle it has risen almost 6 fold in real terms.

Worse yet, the price spikes of the past have tended to be fairly brief. Decisions by consumers and producers to change production processes in order to ration demand and encourage supply takes time. When price spikes are only fleeting, the most lofty part of their peak usually does not get reflected in the decision making process. By contrast, in a totally historically anomalous fashion base metals prices went parabolic from late 2005 to May of 2006. But instead of that price spike being fleeting, it has been followed by a prolonged 8 month sideways trading pattern. Producers and consumers are now feeling this sky high price signal on a sustained basis. So not only is the price rise much greater this time around; it is much more lasting this time around.

The history of base metals markets tells us that the size of the subsequent surpluses, the persistence of such surpluses, and the consequent mountain of inventory is proportional to the percentage rise and persistence of the prior inflation adjusted metals price peak. If history is any guide the inevitable responses of demand rationing and supply encouragement – exacerbated by some significant pockets of economic weakness somewhere around the globe – will result in record sustained surpluses and a heretofore unexperienced mountain of inventory.

Look again at the giant sustained surpluses in palladium after its dizzying manipulation into the year 2000. And the recent unprecedented soaring of palladium stocks now visible on the exchanges. All this history, all these examples point to one thing. Surpluses in stocks in the future beyond imagining.

And this means a very long period of very low prices.

That is the coming nuclear winter for base metals.